

# Frequently asked questions about Hood Canal dissolved oxygen problems

## **What is the problem with water quality in Hood Canal?**

Aquatic life needs dissolved oxygen in order to *breathe*. Hood Canal has had a history of low dissolved oxygen levels, which have caused periodic fish kills. Records of fish kills date back to the early 1960s. Current oxygen levels are the lowest in recorded history, prompting increasing concerns about the long-term health of the canal.

In June and October of 2003, low-oxygen conditions killed thousands of juvenile perch and left numerous octopuses, sea cucumbers and other marine life suffocating and dying. In winter, oxygen levels generally rebound with an exchange of water from the ocean. This year conditions showed little, if any, improvement.

Scientists and citizen groups are now on the lookout for continued problems.

## **What is causing low dissolved oxygen in Hood Canal?**

Hood Canal is naturally prone to developing low dissolved oxygen. This is partly due to the configuration of the canal. It is a narrow 60-mile fjord, which has very slow water circulation.

Another contributing factor is the high productivity of algae in the canal. Sunlight, nutrient availability and strong stratification all affect algae production. Stratification, which is layering according to seawater density, inhibits mixing and keeps the low-oxygen waters away from contact with the air.

Nitrogen enters the canal from the ocean, rivers, and atmosphere and acts as a fertilizer for algae and aquatic plants. Hood Canal algae growth is normally limited by nitrogen in summer because strong stratification prevents upward mixing of the nutrient-rich deep waters and because the available nitrogen gets used up rapidly in spring.

The more nitrogen enters the canal, the more algae will grow. Too much algae causes aesthetic problems and reduces oxygen levels in the canal when the algae rots.

## **Are people causing the problems, too?**

People may be affecting Hood Canal's dissolved oxygen in several ways. One important way is by adding nitrogen. While nitrogen is a key nutrient for life, too much of it can create problems.

Many activities associated with people contribute to nitrogen in the canal, including fertilizers, human sewage, animal manure and decaying fish carcasses. When released into the water, nitrogen helps grow algae, both seaweed and phytoplankton (small

microscopic plants). When the algae and plankton die and decompose, they rob oxygen from the water that fish, shrimp and other aquatic life need to survive.

### **Where does nitrogen come from and how much is getting into Hood Canal?**

The Puget Sound Action Team and Hood Canal Coordinating Council (HCCC), along with other scientists, studied information about the amount of nitrogen going into the canal and determined that the primary sources of nitrogen associated with human activities collectively put between 100 to 300 tons of nitrogen into the canal every year. The wide range of these estimates is due to the difficulty in measuring precisely the nitrogen content of each source, as well as some uncertainty about how much nitrogen from each source ultimately makes it into the canal.

Human sewage:.....	39-241 tons (60 percent of the estimated nitrogen from human activities)
Agriculture manure:.....	18-22 tons (14 percent)
Chum salmon carcasses:.....	16-24 tons (13 percent)
Stormwater runoff: .....	12-24 tons (11 percent)
Forestry:.....	0.5-5 tons (1 percent)
Discharges from point sources:.....	0.3-3 tons (less than 1 percent)

### **What other factors contribute to Hood Canal water quality problems?**

In addition to the human contributions of nitrogen to the low oxygen levels, variable ocean conditions, Hood Canal's slow water circulation and flushing, and alterations in river flows also may contribute to the low-oxygen levels.

The canal is 60-miles long, very deep in some areas and shallow in other areas. It usually takes months to a year for water to exchange in Hood Canal. In most other parts of Puget Sound, water is exchanged every few days or weeks. The dynamics of circulation and mixing of the canal's waters are complex and add to the conditions that contribute to the low oxygen.

### **What is being done to improve water quality in Hood Canal?**

The Hood Canal low-oxygen problem is still under scientific study. Scientists do not completely understand the whole of the problem, and therefore, a whole solution is not devised.

Scientists and resource managers working on the Hood Canal problem know that the early actions they have recommended, to reduce and stop nutrient pollution coming from people's activities, are good for water quality. They are insurance against further worsening of the problem.

### **Who's working on Hood Canal and what are their roles?**

**Puget Sound Action Team** (Action Team) has the lead role for the state to communicate human contributions to the low dissolved oxygen levels, as well as to recommend actions people can take to improve the water quality in Hood Canal. It also has funding available for innovative and effective projects to help improve dissolved oxygen levels in Hood Canal.

The **Washington Department of Ecology** has the lead science role and response to reports of fish kills, changes in fish behavior or algae blooms. Ecology has worked in partnership with the **University of Washington** oceanographers to measure current conditions and compare them with historical data from the 1950s and 1960s, which showed more oxygen than present values.

In addition, Ecology works with the watershed planning units. Ecology, the **Skokomish Tribe**, **Mason County** and **Mason Conservation District** are working on the Total Maximum Daily Loads, water cleanup plans, for fecal coliform in the Skokomish and Union rivers, both of which flow into the canal.

Additionally, Ecology offers low-interest, competitive loans and grants to local jurisdictions. This funding can help pay for planning and construction of sewer and stormwater systems, conducting public outreach and education, taking steps that protect water quality and control runoff, and monitoring water quality. The current application cycle for this funding is September 1 through November 1, 2004.

The **Washington Department of Fish and Wildlife** (WDFW) has primary responsibility for protecting fish and other marine life that inhabit the waters of Hood Canal. In each of the past three years, WDFW has taken emergency action to close recreational and commercial fisheries for species threatened by low dissolved oxygen levels in the canal. In August of 2004, the Washington Fish and Wildlife Commission indefinitely closed fishing for all species except salmon, sturgeon, trout, crab, shrimp, oyster and clams until conditions improve.

Meanwhile, WDFW has increased monitoring of fisheries to determine the impact of low dissolved oxygen levels on fish life. The department is also working with the Department of Ecology, the Hood Canal Salmon Enhancement Group and others to track conditions on the canal and has established an informal reporting system for divers and fishers to report sightings of unusual events.

WDFW has been a regular participant in public forums on low dissolved oxygen conditions and their effect on marine life.

A partnership is conducting the Hood Canal Dissolved Oxygen Program's Integrated Assessment and Modeling study resource managers from the **University of Washington**, the **Hood Canal Salmon Enhancement Group**, the **U.S. Geological Survey**, the **Action Team**, **Ecology**, and **Skokomish tribe** and other agencies. The three-year study will quantify the causes of the low-oxygen problem and use computer models to test

corrective actions. This purpose of this larger and more comprehensive partnership is to aid the understanding of the Hood Canal marine and freshwater systems through monitoring and modeling of the canal's ecosystem.

### **What are the recommended early actions?**

In the Hood Canal Low Dissolved Oxygen Preliminary Assessment and Corrective Action (PACA), completed in May 2004, the Action Team and HCCC identified the primary human causes of nutrient pollution and the most feasible corrective actions or fixes to those problems.

The PACA recommends several preliminary actions to reduce the nutrient pollution. Some of the actions include increasing areas with community sewer systems, exploring non-regulatory options for onsite sewage systems and stormwater runoff, developing alternatives to marine disposal of salmon carcasses, bolstering the use of low impact development techniques, and providing manure and nutrient management information, training and incentives for farmers.

### **Is there any funding available?**

The Action Team plans to award up to \$600,000 for innovative and effective projects to help improve dissolved oxygen levels in Hood Canal. It will award funds between \$10,000 and \$100,000 for each project later in summer 2004.

The U.S. Congress appropriated \$500,000 and the Washington state legislature appropriated \$100,000 for this funding. The major portion of federal funding requires that the projects be innovative and demonstrate how to proceed with future efforts. Projects must either test or demonstrate innovative approaches to solving problems, implement urgent and obvious actions, or provide education and public involvement that reduces nutrient pollution.

### **When will water quality in Hood Canal improve?**

It took a long time for Hood Canal to get sick and it may take a long time for it to recover. One single action will not solve the problem and fix the canal. Rather, it will take many individual actions by many people. It's important to start the healing now. The Action Team urges people to make changes now in how they care for the canal.

### **Specifically, what can people do to help?**

If you live along Hood Canal and have an onsite sewage system or backyard septic system, get it inspected now. Make sure that it is in top working order.

If you have cows, horses, or other farm animals, make sure you keep them out of the canal and nearby streams, and manage their manure properly.

Pick up after your pets and properly dispose of your pet's waste.

If you use fertilizer in your yard or garden, read and follow the instructions carefully, and use fertilizer sparingly, or better yet, choose to go without fertilizer.

Keep an eye on Hood Canal. If you see algae blooms, dead fish, or odd behavior by fish or other marine animals, **800- OILS-911**, at the Washington State Emergency Management Department.

### **How can I volunteer to help?**

You can join your neighbors in their efforts to collect samples of water from the canal, by calling the Hood Canal Salmon Enhancement Group at (360) 275-3575.

Volunteers working with the Hood Canal Salmon Enhancement Group are collecting water samples in the canal to help the Department of Ecology and University of Washington analyze dissolved oxygen levels and nitrogen. The Action Team's public involvement and education funds have helped pay for this monitoring.

### **What else is being done?**

- **Neighbors of the Hood Canal** are providing information about education and volunteer opportunities for fellow citizens. They inform people via a newsletter and are planning to create a Web site.
- The **Skokomish Tribe** will breach a dike in the Skokomish River delta. This will help flush the estuary and should help with nutrient levels.
- **Kitsap Health District** is currently focusing work in a priority area in north Hood Canal, conducting door-to-door surveys and offering workshops about onsite sewage systems.
- **Mason County Department of Health Services** is updating its on-site sewage system database to provide owners with useful information about how to operate and maintain their systems.
- Students will work with Ecology to collect water samples from Hood Canal streams to test fecal coliform and nitrate. Ecology and Action Team are helping to fund this project, which is being led by the **Hood Canal Watershed Education Network** and the **Governor's Council for Environmental Education**.
- In fall 2004, **Washington State University Extension** will launch a social marketing campaign to educate homeowners about ways to reduce nitrogen through maintaining onsite sewage systems and landscaping practices. Ecology and Action Team are helping to fund this project.

- The **Hood Canal Coordinating Council** will work with the DeWatto community to educate homeowners about shoreline stewardship, landscaping, maintaining onsite sewage systems, and identifying restoration projects. The Action Team helped fund this project.

**How can I stay updated and find out the latest information?**

On the Web, go to: [http://www.psat.wa.gov/Programs/hood\\_canal.htm](http://www.psat.wa.gov/Programs/hood_canal.htm)

For current conditions, go to: <http://www.prism.washington.edu/hcdop/index.html>

If you have specific questions about things you can do to help, call the Action Team at 800-54-SOUND.

Subscribe for free, regular e-mail updates about Hood Canal from the Action Team. Go here to subscribe: [http://www.psat.wa.gov/Site\\_index/listserv.htm](http://www.psat.wa.gov/Site_index/listserv.htm).